

PHOSPHORIC ACID

CAS Registry Number: 7664-38-2

H₃PO₄

Molecular Formula: H₃O₄P

Phosphoric acid is a colorless, odorless, relatively strong acid which is either a sparkling liquid or transparent solid, depending on its concentration and temperature. Phosphoric acid is soluble in water and alcohol and is corrosive to ferrous metals, alloys, porcelain, and granite ware. It is manufactured by the treatment of phosphate rock. When suitably diluted, it has a pleasant, acid taste (HSDB, 1991; Merck, 1989).

Physical Properties of Phosphoric Acid

Synonyms: orthophosphoric acid; o-phosphoric acid

Molecular Weight:	98.00
Boiling Point:	213 °C
Melting Point:	42.35 °C
Density/Specific Gravity:	tribasic acid (at 25 °C) 1.8741 (100 % solution) (water = 1)
pH:	1.5 (0.1 N aqueous solution)
Vapor Pressure:	0.03 mm Hg at 20 °C
Vapor Density:	3.4 (air = 1)
Conversion Factor:	1 ppm = 4.01 mg/m ³

(HSDB, 1991; Merck, 1989)

SOURCES AND EMISSIONS

A. Sources

Phosphoric acid is used in fertilizers, soaps and detergents, inorganic phosphates, pickling and rust-proofing of metals, in pharmaceuticals, sugar refining, gelatin manufacturing, water treatment, animal feeds, electropolishing, conversion coatings for metals, dental cements, acid catalysts, in foods and carbonated beverages, and as a laboratory reagent (Sax, 1987). It is also used in direct acid treatment of metal surfaces, manufacture of fire control agents, antifreeze, catalysts, drilling muds, phosphors, refractories, and dyeing textiles (HSDB, 1991).

Phosphoric acid is registered as a bactericide and disinfectant. It is used to disinfect dairy farm milk handling facilities, equipment and dairy animals, and food processing water systems. It is also used to disinfect food processing/handling areas, kitchens, and bathrooms. It may also be

used in eating establishments for sterilizing equipment and utensils. Agriculturally, phosphoric acid is registered as an adjuvant (DPR, 1996).

The licensing and regulation of pesticides for sale and use in California are the responsibility of the Department of Pesticide Regulation (DPR). Information presented in this fact sheet regarding the permitted pesticidal uses of phosphoric acid has been collected from pesticide labels registered for use in California and from DPR's pesticide databases. This information reflects pesticide use and permitted uses in California as of October 15, 1996. For further information regarding the pesticidal uses of this compound, please contact the Pesticide Registration Branch of DPR (DPR, 1996).

The primary stationary sources that have reported emissions of phosphoric acid in California are public order and safety facilities, manufacturers of measuring and controlling devices, and coating, engraving, and allied services (ARB, 1997b).

B. Emissions

The total emissions of phosphoric acid from stationary sources in California are estimated to be at least 53,000 pounds per year, based on data reported under the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

Phosphoric acid is a natural constituent of many fruits and their juices (HSDB, 1991).

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of phosphoric acid.

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of phosphoric acid was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

Phosphoric acid will exist in the particle phase in the atmosphere, and hence be subject to wet and dry deposition. The average half-life and lifetime for particles in the atmosphere is estimated to be about 3.5 to 10 days and 5 to 15 days, respectively (Atkinson, 1995; Balkanski et al., 1993).

AB 2588 RISK ASSESSMENT INFORMATION

Although phosphoric acid is reported as being emitted in California from stationary sources, no health values (cancer or non-cancer) are listed in the California Air Pollution Control Officers Association Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to phosphoric acid are inhalation, ingestion, and dermal contact.

Non-Cancer: The significant toxic effects from exposure to phosphoric acid result from its acidity. Inhalation exposure from sprays or mist can result in irritation of the nose and throat, coughing, and lung irritation (Sittig, 1991). Individuals with chronic pulmonary disease or skin disease may be particularly sensitive to the toxic effects of phosphoric acid (HSDB, 1995).

Cancer: The International Agency for Research on Cancer and the United States Environmental Protection Agency have not classified phosphoric acid as to its carcinogenic potential (IARC, 1987a; U.S. EPA, 1995a).

